# deep-learning-challenge

For this part of the assignment, you’ll write a report on the performance of the deep learning model you created for Alphabet Soup.

The report should contain the following:

1. **Overview** of the analysis: Explain the purpose of this analysis.

* The analysis used real world dataset which contains more than 34,300 organizations ‘data, funded by Alphabet Soup. The purpose of the analysis is to create a deep learning neural network model to predict the success/failure of the future funds.

1. **Results**: Using bulleted lists and images to support your answers, address the following questions:

* Data Preprocessing
  + What variable(s) are the target(s) for your model?
    - The column named "IS\_SUCCESSFUL" is target of this model (dependent variable)
* What variable(s) are the features for your model?
  + - During optimization attempts, different feature sets were used to understand their effects on the loss/accuracy.
* What variable(s) should be removed from the input data because they are neither targets nor features?
  + - For all optimization attempts "EIN" and "NAME" variables were removed.

1. Compiling, Training, and Evaluating the Model

* How many neurons, layers, and activation functions did you select for your neural network model, and why?
  + - Main neural network model contained two hidden layers with 80 and 30 neurons respectively. The hidden layers used "relu" activation function while the output layer used 'sigmoid' activation function. In this analysis, the epochs number was 100 and 150.
* Were you able to achieve the target model performance?
  + - The original neural network model could not achieve the target model performance which is 75%. The accuracy of this model was approximately 73% and the loss was 56%. Maybe I overtrained my dataset, I should have started with small numbers and I believe I would have achieved higher accuracy rate.
* What steps did you take in your attempts to increase model performance?
  + - Three different attempts were made to optimize the model:
    - Attempt #1 In this attempt, couple of different alterations were made to model. Two more variables were dropped ('STATUS' and 'SPECIAL\_CONSIDERATION'), binning structures of 'APPLICATION\_TYPE' and 'CLASSIFICATION' variables have been changed, a new hidden layer was added with 60 neurons. After all these changes, accuracy level stayed same (73%) while loss level increase (58%).
    - Attempt #2 In this attempt, number of epoch were increased to 150 from 100.The new hidden layer that was added in attempt 1 stayed the same. After change in the epoch numbers, the accuracy level stayed same (73%) while loss level increased by (58%).
    - Attempt #3 Last attempt was made by adding two more dense layers to original model. This new model has 73% accuracy and 58% loss.

1. **Summary**: Summarize the overall results of the deep learning model. Include a recommendation for how a different model could solve this classification problem, and then explain your recommendation.
   * + None of three optimization attempts had achieved an increase in the accuracy, instead there was an increase in loss. Since there are a lot of categorical data in our dataset, it may be best to try the decision tree or random forest method might work well for this purpose.